Claims

What is claimed is:

1. An optical input substrate, which is a substrate on which a semiconductor integrated circuit can be mounted, comprising:

two or more photodetectors capable of converting optical signals that are received as input to electrical signals and supplying these electrical signals to a mounted semiconductor integrated circuit;

wherein the heights of said two or more photodetectors are identical.

2. An optical input substrate, which is a substrate on which a semiconductor integrated circuit can be mounted, comprising:

two or more photodetectors capable of converting optical signals that are received as input to electrical signals and supplying these electrical signals to a mounted semiconductor integrated circuit;

wherein the heights of said two or more photodetectors are identical, and moreover, wherein at least one of these two or more photodetectors is provided with an optics element having the function of focusing light that is received as input toward the photoreception surface of the photodetectors.

3. An optical input substrate according to claim 1, wherein all or a portion of said two or more photodetectors have a common electrode pattern.

4. An optical input substrate according to claim 2, wherein all or a portion of said two or more photodetectors have a common electrode pattern.

5. An optical output substrate, which is a substrate on which a semiconductor integrated circuit can be mounted, comprising:

two or more light-emitting devices capable of converting electrical signal that are supplied as output from a mounted semiconductor integrated circuit to optical signals and supplying these optical signals as output;

wherein the heights of said two or more light-emitting devices are identical.

6. An optical output substrate, which is a substrate on which a semiconductor integrated circuit can be mounted; comprising:

two or more light-emitting devices capable of converting electrical signals supplied as output from a mounted semiconductor integrated circuit to optical signals and supplying these optical signals as output;

wherein the heights of said two or more light-emitting devices are identical, and moreover, wherein at least one of said two or more light-emitting devices is provided with an optics element having the function of focusing light supplied as output from the light-emitting surface of the light-emitting devices.

7. An optical output substrate according to claim 5, wherein all or a portion of said two or more light-emitting devices have a common electrode pattern.

8. An optical output substrate according to claim 6, wherein all or a portion of said two or more light-emitting devices have a common electrode pattern.

9. An optical input/output substrate, which is a substrate on which a semiconductor integrated circuit can be mounted; comprising:

two or more photodetectors capable of converting optical signals that are received as input to electrical signals and supplying these electrical signals to a mounted semiconductor integrated circuit; and

two or more light-emitting devices capable of converting electrical signals that supplied as output from a mounted semiconductor integrated circuit to optical signals and supplying these optical signals as output;

wherein the heights of said two or more photodetectors are identical, and moreover, the heights of said two or more light-emitting devices are identical.

10. An optical input/output substrate according to claim 9, wherein the heights of said two or more photodetectors and the heights of said two or more light-emitting devices are identical.

11. An optical input/output substrate according to claim 9, wherein one or both of said photodetectors and light-emitting devices are provided with optics elements having the function of focusing incident light.

12. An optical input/output substrate according to claim 10, wherein one or both of said photodetectors and light-emitting devices are provided with optics elements having the function of focusing incident light.

13. An optical input/output substrate according to claim 9, wherein all or a portion of said two or more photodetectors and light-emitting devices have a common electrode pattern.

14. An optical input/output substrate according to claim 10, wherein all or a portion of said two or more photodetectors and light-emitting devices have a common electrode pattern.

15. An optical input/output substrate according to claim 11, wherein all or a portion of said two or more photodetectors and light-emitting devices have a common electrode pattern.

16. An optical input/output substrate according to claim 12, wherein all or a portion of said two or more photodetectors and light-emitting devices have a common electrode pattern.

17. An optical input/output substrate according to claim 9, wherein the melting point of solder for securing said photodetectors to said substrate is different from the melting point of solder for securing said light-emitting devices to said substrate.

18. An optical-element integrated semiconductor integrated circuit, wherein a semiconductor integrated circuit is mounted on an optical input substrate according to claim 1, and electrical signals that have been converted by photodetectors belonging to said optical input substrate are supplied as output to the electrical signal input ports of this semiconductor integrated circuit.

19. An optical-element integrated semiconductor integrated circuit, wherein a semiconductor integrated circuit is mounted on an optical output substrate according to claim 5, and electrical signals supplied as output from

the electrical signal output ports of this semiconductor integrated circuit are converted to optical signals by light-emitting devices belonging to said optical output substrate and supplied as output.

20. An optical-element integrated semiconductor integrated circuit, wherein a semiconductor integrated circuit is mounted on an optical input/output substrate according to claim 9, and electrical signals that have been converted by photodetectors belonging to said optical input/output substrate are supplied as output to electrical signal input ports of this semiconductor integrated circuit, and electrical signals that are supplied as output from electrical signal output ports of said semiconductor integrated circuit are converted to optical signals by light-emitting devices belonging to said optical input/output substrate and supplied as output.

21. A fabrication method of an optical input substrate on which are mounted two or more photodetectors for converting received optical signals to electrical signals, said fabrication method comprising photodetector mounting steps that include steps of:

forming bumps on only necessary photodetectors of a photodetector array;

using said bumps to mount said photodetector array on a substrate to thus connect photodetectors on which said bumps have been formed to input ports of said substrate;

covering said photodetectors that have been connected to said input ports with a protective film;

removing unnecessary photodetectors that are not covered with said protective film from said photodetector array; and

removing said protective film.

22. A fabrication method of an optical output substrate on which are mounted two or more light-emitting devices for converting received electrical signals to optical signals, said fabrication method comprising light-emitting device mounting steps that include steps of:

covering only necessary light-emitting devices among a light-emitting device array with a protective film;

removing the functional portions of unnecessary light-emitting devices that are not covered by said protective film;

removing said protective film; and

mounting said light-emitting device array in which the functional portions of said unnecessary light-emitting devices have been removed on a substrate, and connecting said necessary light-emitting devices to output ports of said substrate.

23. A fabrication method of an optical output substrate on which are mounted two more light-emitting devices for converting received electrical signals to optical signals, said fabrication method comprising light-emitting device mounting steps that include steps of:

covering only necessary light-emitting devices in a light-emitting device array with a protective film;

removing unnecessary light-emitting devices that are not covered by said protective film together with the element substrate;

removing said protective film; and

mounting said light-emitting device array in which said unnecessary light-emitting devices have been removed on a substrate and

connecting said necessary light-emitting devices to output ports of said substrate.

24. A fabrication method of an optical input/output substrate on which are mounted both photodetectors and light-emitting devices, said fabrication method comprising:

photodetector mounting steps that include steps of:

forming bumps on only necessary photodetectors in a photodetector array;

using said bumps to mount said photodetector array on a substrate and thus to connect photodetectors on which said bumps have been formed to input ports of said substrate;

covering said photodetectors that have been connected to said input ports with a protective film;

removing unnecessary photodetectors that are not covered by said protective film from said photodetector array; and

removing said protective film; and

light-emitting device mounting steps that include steps of:

covering only necessary light-emitting devices in a light-emitting device array with a protective film;

removing the functional portions of unnecessary light-emitting devices that are not covered by said protective film;

removing said protective film; and

mounting on a substrate said light-emitting device array in which the functional portions of said unnecessary light-emitting devices have been removed, and connecting said necessary light-emitting devices to output ports of said substrate.

25. A fabrication method of an optical input/output substrate on which both photodetectors and light-emitting devices are mounted, said fabrication method comprising:

photodetector mounting steps that include steps of:

forming bumps on only necessary photodetectors in a photodetector array;

using said bumps to mount said photodetector array on a substrate to thus connect photodetectors on which said bumps have been formed to input ports of said substrate;

covering said photodetectors that have been connected to said input ports with a protective film;

removing unnecessary photodetectors that have not been covered by said protective film from said photodetector array; and

removing said protective film; and

light-emitting device mounting steps that include steps of:

covering only necessary light-emitting devices in a light-emitting device array with a protective film;

removing unnecessary light-emitting devices that have not been covered by said protective film together with the element substrate;

removing said protective film; and

mounting said light-emitting device array from which said unnecessary light-emitting devices have been removed, and connecting said necessary light-emitting devices to output ports of said substrate.

26. A fabrication method of an optical input substrate according to claim 21, further including a step of etching the element substrate of said photodetector array to form a thin-film.

27. A fabrication method of an optical output substrate according to claim 22, further including a step of etching the element substrate of said light-emitting device array to form a thin-film.

28. A fabrication method of an optical output substrate according to claim 23, further including a step of etching the element substrate of said light-emitting device array to form a thin-film.

29. A fabrication method of an optical input/output substrate according to claim 24, further including a step of etching one or both of the element substrate of said photodetector array and the element substrate of said light-emitting device array to form a thin-film.

30. A fabrication method of an optical input/output substrate according to claim 25, further including a step of etching one or both of the element substrate of said photodetector array and the element substrate of said light-emitting device array to form a thin-film.

31. A fabrication method of an optical input substrate according to claim 21, further including a step of etching the element substrate of said photodetector array to form a lens.

32. A fabrication method of an optical output substrate according to claim 22, further including a step of etching the element substrate of said light-emitting device array to form a lens.

33. A fabrication method of an optical input/output substrate according to claim 24, further including a step of etching one or both of the element substrate of said photodetector array and the element substrate of said light-emitting device array to form lenses.

34. A fabrication method of an optical input/output substrate according to claim 25, further including a step of etching one or both of the element substrate of said photodetector array and the element substrate of said light-emitting device array to form lenses.